

REMARKS

Status of Claims

By this Amendment, claims 1 and 16 have been amended to clarify that the hot melt conductor paste composition according to the invention is a solid at 25°C and melts at a temperature within the range of from about 35°C to about 90°C. In addition, new claim 21 has been added to the application to round out applicants' claim coverage. New claim 21 includes all of the limitations of claim 16 (as amended herein) plus two additional limitations: (1) that the hot melt conductor paste composition applied to the silicon substrate is allowed to cool to a temperature below the melting point of the thermoplastic polymer system such that it solidifies on the silicon substrate; and (2) that an additional electronic paste material is applied onto the solidified hot melt conductor paste composition prior to firing. Claim 21 clearly adds no new matter to the application inasmuch as both of the additional limitations are expressly taught in paragraph [0022] of the specification. Claims 1-21 are presently pending in the application.

Reply to Rejection

In the prior Office action, claims 1-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over DE-3804831 in combination with Ross (U.S. 4,219,448), Hanoka (U.S. 5,698,451) or Amick et al. (U.S. 5,320,684). As noted above, applicants have amended claims 1 and 16 to clarify that it is the paste composition itself (and not just the thermoplastic polymer system component thereof) that "is a solid at 25°C and melts at a temperature within the range of from about 35°C to about 90°C." In view of this clarification, applicants assert that claims 1-21 are allowable over the cited references for the reasons set forth below.

The English abstract of DE-3804831 teaches an electroconductive coating composition used in the manufacture of solar cells. The electroconductive coating contains 50-85% by weight silver, 5-15% by weight of a thermoplastic polyester resin having a molecular weight of from 10,000-40,000, and 10-45% by weight of an organic solvent. The Examiner correctly notes that DE-3804831 fails to teach a coating having up to 50% glass particles, as is specified in claims 1 and 16 of the present application.

However, the Examiner states that it would have been obvious to modify DE-3804831 by adding a glass frit as shown by Ross, Hanoka or Amick et al. "with the expectation of achieving similar success and an improvement in the adherence of the coating composition to the silicon substrate." Applicants respectfully submit that the rejection is improper because the cited references, even if combined as suggested by the Examiner, fail to teach all of the limitations of applicants' claims.

The composition taught by DE-3804831 contains 10-45% by weight of an organic solvent that dissolves the polyester resin, thereby forming a "lacquer" or "conductive paint" composition that is a liquid, rather than a solid, at room temperature (~25°C). Contrary to applicants' invention, Examples 1 and 3 of DE-3804831 specifically teach that the conductive paint composition is "dried." (see, e.g., col. 3, lines 13-14: "Man trocknet die Anordnung bei 150°C während 60 Min." which loosely translates from German to English as "One dries the arrangement with 150°C during 60 Min."; and col. 3, line 55: "Man trocknet bei 150°C für 30 Min." which loosely translates from German to English as "One dries at 150°C for 30 Min."). DE-3804831 teaches that the composition is applied to a substrate by silkscreen printing and is then dried at a temperature of less than 200°C.

In contrast to DE-3804831, the hot melt conductor paste of the present invention is a solid at 25°C that is melted at a temperature within the range of from about 35°C to about 90°C and applied in molten form to a substrate. Upon cooling, the hot melt conductor paste according to the invention rapidly returns to its solid state almost immediately after application to the substrate. Since the DE-3804831 reference does not teach a paste composition that is "solid at 25°C and melts at a temperature within the range of from about 35°C to about 90°C," but instead teaches a composition that is liquid at room temperature that must be dried, the combination of DE-3804831 with any of the other references cited by the Examiner does not result in Applicants' claimed composition. Accordingly, Applicants respectfully assert that claims 1-21 are patentable over the cited prior art references. Reconsideration of the application is hereby requested.

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Conclusion

In light of the foregoing, it is submitted that claims 1-21 are in condition for allowance, and a notice to that effect is therefore earnestly solicited.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Kenneth A. Clark", is written over a horizontal line.

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